

**I like what you say, but why should I believe it?:
Comments on the Public Review Draft of the 2005 California Water Plan Update**

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The California Water Plan is a central document for California's water community and the broader community interested in the state's water issues. While the Plan has no project-specific authority, it has a variety of important functions.

Functions of the Water Plan

Education. The most important function of the California Water Plan is as an educational document for political leadership (or their staff), the public, and the California water community. California's water problems are quite complex and change substantially with time. It is very useful to have a central document to provide a contemporary perspective on these problems.

Leadership in water management. The second most important function of the Plan is as a form of leadership in addressing California's water problems. This leadership has takes two forms: leadership in content and leadership in method. Leadership in content is the State's official orientation towards California's water problems and their solution. Leadership in policy-making and technical method shows how the State approaches developing good solutions. State leadership is important for statewide, local, and regional agencies and activities.

Reference document. A final important use for the Plan is as a reference document, as an official set of projections and statistics useful for local, regional, and statewide policy-makers. The purposes of these data extend beyond this single Plan. However, the Plan provides an opportunity to present and discuss the implications of our best understanding of the water system and its future, and explore the quality of our imperfect understanding.

Improvements over Bulletin 160-98

Bulletin 160-05 makes several major improvements over Bulletin 160-98. Most improvements arise from the bold new direction of the plan. Some improvements are, in fact, significant extensions of innovations in Bulletin 160-98. However, as with many sizable innovations, their first implementations show a need for additional work.

Consensus process

The new plan's greatest improvement is the adoption of a quasi-consensus process for plan development. This is a radical departure from all previous plans. This new approach is indispensable for reflecting the reality that practical, political, and financial capability in water management has shifted from the State to local and regional agencies. Traditional centralized State water planning is simply irrelevant for the foreseeable future. The older approach was a dead-end, unsuitable for today's water problems. While this new approach (a good example of "leadership in method") had some very significant successes, it has not been a complete success and will require significant refinement.

Local and Regional Water Management Emphasis

Traditional California water plans have tended to be plans and justifications for developing new State Water Project facilities. For many decades, this was largely appropriate. The completion of the most economical facilities and shifts of financial, political, and technological initiative from State to local and regional governments requires that the water plan shift to become a plan for State cooperation and leadership within a complex set of regional and local water management actions. Most water management, demands, and funding are now local and regional. The new State water plan reflects this.

Additional time and work on the part of DWR and many others is needed to refine this change in direction to make it more effective for aiding long-term cooperation among California's many water managers and decision-makers. However, the direction of these first steps is superb.

Broad Range of Water Management Options

Part of the shift towards local and regional initiative in water management has been a shift in water management technologies to water conservation, wastewater reuse, water transfers, and other options better implemented by local and regional agencies. Thus, it is wholly appropriate for the Water Plan to devote more emphasis to the broad range of water management activities. Volume 2 is a superb collection of summaries of each of 25 water management options, which should be of widespread value, at least in demonstrating that water planning for California is no longer limited to planning new reservoirs. Equating water planning with new surface storage has been ineffective and misleading in recent years. However, integrating a portfolio of options remains a deficiency of the plan.

Abandonment of Requirements-based Planning or "Gap" Analysis

Prior Water Plan quantitative analysis, since 1983, has been unsuitably crude. Problems with subtracting a crude estimate of supply quantity from a crude estimate of water demand quantity to determine a "need" for additional supply are well discussed elsewhere (Lund and Wilkinson 2005). The abandonment of this crude, un-insightful, and often misleading quantitative approach is welcome progress. A more suitable analytical framework should help policy makers think more flexibly, pragmatically, and comparatively about solutions to California's water problems.

Transparency

The method of plan development has been largely transparent. Sometimes this has not been pretty, but it has made the result much more understandable. DWR Water Plan staff have accomplished much in this regard. With the inherent complexity of California's water system, transparency will never be the same as simplicity.

Weaknesses compared with Bulletin 160-98

Lack of a Coherent Analytical Framework

While it is easy to criticize the simplistic and often misleading "gap" analysis of previous water plans, it is clear that the current water plan has not provided a clearly superior substitute. Without an analytical framework, a consensus process tends to devolve into lowest-common-denominator conclusions, some of which will be wrong, in terms of facts on the ground. Having

a common analytical framework allows for a better common understanding of how the water system works, a way to scientifically test, support, and refine policy conclusions, and a more transparent, detailed, and consistent comparison of policy alternatives.

Since the end of the era when California Water Plans were essentially plans for developing State Water Project facilities (1930-1987), there has been no serious quantitative basis for developing or supporting California Water Plan conclusions. Application of resources, expertise, and leadership commitment within DWR for such a task has been largely absent, despite some good intentions and occasional noble efforts.

Since Bulletin 160-98, efforts have been taken to explore more promising approaches to analyzing water management in California for planning purposes. For southern California, MWDSC and SDCWA have serious and fairly comprehensive efforts to develop and apply data and analytical capability in an integrated way for their regions. Another major effort is the CALVIN project at UC Davis. About two dozen researchers from several disciplines have been involved over the last 7 years in developing, testing, and applying this largely statewide model, funded by about a half-dozen agencies. The model's development and applications have been the subject of (so far) 10 peer-reviewed publications and hundreds of pages of on-line documentation. Indeed, CALVIN is probably the most peer-reviewed data set and analytical tool for water planning purposes in California, with the best documentation and discussion of limitations. CALVIN results recently formed a well-accepted basis of public and policy discussions of Hetch Hetchy restoration. Elsewhere, the State of Texas sponsors and supports a comprehensive statewide and regional water data and modeling capability (Wurbs 2005).

Technically, these statewide and regional efforts effectively demonstrate that:

- a) A comprehensive and integrated framework to understand and explore the thousands of water management options available to Californians is technically possible, leads to insightful results, and can pass extensive peer-review. Apparently, a bunch of students and professors (in California and Texas) can do what has not been possible for the California Department of Water Resources.
- b) Data availability and quality imposes limitations for our understanding of water and water management in California. These limitations are everywhere, but are especially important for some basins. Most disheartening is the lack of a common DWR framework for developing and integrating surface water, groundwater, water demand, and water management data and models. Different agencies often have different approaches to data and analysis. The lack of consistency within DWR is astonishing and detracts from the credibility of all DWR's technical efforts (not just the Water Plan).
- c) We will never truly understand how to improve data and modeling without investing in an effort to do serious modeling and data management. Model calibration and testing helps identify and remedy data limitations faster than passive data collection alone.
- d) No model ever will be perfect, and it will probably not be possible to develop a truly comprehensive analytical framework in our professional lifetimes. (CALVIN, for example, lacks many water quality and institutional considerations, and reflects many statewide data problems.) However, the absence of perfectibility need not preclude progress.

- e) It is possible to learn more about the management and limitations of a system through thoughtful imperfect modeling, than by abandoning quantitative analysis in favor of “faith-based” analysis.
- f) CALVIN is not the solution to the California Water Plan’s analytical and data problems. However, this and other efforts show that it is possible to do a much better job representing statewide water supplies and demands in an integrated and useful way than DWR has been able to do.

DWR should learn from these examples. One lesson is that DWR alone is unlikely to achieve a technical capability to analyze and account for water, water demands, and water management statewide. A broader long-term institutional effort is required to develop such capability, drawing on the authority, talents, and resources of many agencies and entities statewide.

A functional scientific framework for developing, comparing, and supporting alternatives for water management will require a significant supplement or re-alignment of DWR’s resources and talents, as well as the engagement of serious leadership and exercise of its authority in this area. More difficult, but just as important, DWR must actively bring in local and regional expertise, data, and resources into such a framework. The framework must have broad technical support from both water stakeholders and expertise outside of DWR. It cannot be a DWR show alone. While DWR has the authority for such an undertaking, DWR will never realistically have the budget or breadth of expertise needed to support a viable framework. This will require a considerable change in DWR’s institutional culture and internal management.

It is regrettable, albeit understandable, that the CWP process has not brought the same ambitious breadth of expertise and consensus to its technical activities as it has to its policy activities.

Suggestions for further improvement

Refinement of the broad Water Plan process

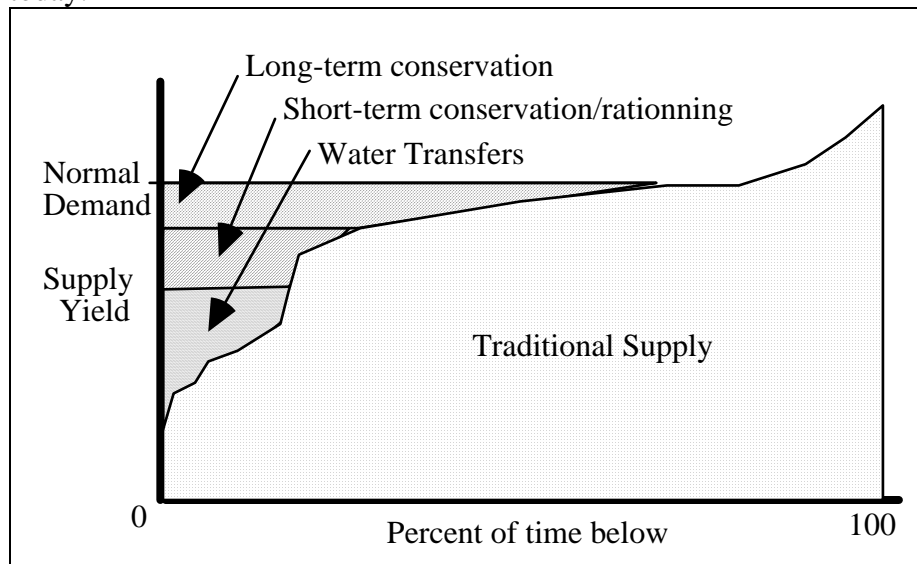
The more broad-based and public Water Plan process has been a significant improvement. However, as a first-time effort for such a broad, diverse, and complex planning problem some improvements and refinements are needed. The balance between “open-microphone” expression and focused constructive comments was often unfavorable to thoughtful or productive discourse. A little of this problem was due to changes in political administration mid-process. Kamyar Guivetchi’s astonishing levels of professional integrity and resilience were challenged too much and utilized too little by the larger process.

Something must be done to provide more group leadership and responsibility for the final product. Alas, I am not sure how to do this. With improved high-level leadership and structure, DWR staff and managers, the facilitators, and the Advisory Committee members could have suffered less and accomplished more. Much of this is the awkwardness of any new process.

Integration of Water Management Options

While the presentation of 25 diverse water management options is a significant advance for the California water plan, a plan should more than a listing of options, it should help suggest how these options should be usefully put together. A depiction of such an integration appears in the

figure below, which modifies the common delivery-reliability curve to show how a portfolio water management options can respond to the wide range of hydrologic conditions experienced by real water systems. This approach is employed by many local and regional water agencies today.



Analysis of plan alternatives

For a water system as physically and institutionally complex as California's, quantitative analysis is essential. A plan should be supported by a relatively scientific comparison of alternatives. The current plan has almost no serious quantitative analysis to help support, guide, and test thinking and decision-making on this difficult subject. There is only the beginning of a realization that a coherent analytical framework is needed for the purposes of the California water plan (and California water management generally). If airplanes were designed with the same analytical support as we have for this water plan, we would all take trains. Any corporation that accounted for money as well as the water plan accounts for water would be shunned by investors and under investigation by the SEC. The current plan is limited to the consensus of a large group of diverse and experienced people (quite a valuable accomplishment itself), but we have few coherent numbers to test or support these ideas.

The challenges to developing a coherent and purposeful analytical framework for California's water are considerable. Such an analytical framework needs:

- Strong data development, management, and documentation
- Strong modular detailed simulation models of water supply, management, use processes
- Coarser simulation and optimization models to provide guidance among the incredibly numerous interacting local, regional, and statewide management options and scenarios
- Strong and broad institutional support

Some efforts in this direction have been undertaken. MWDSC and SDCWA have developed impressive computer modeling capabilities for their systems. On a statewide scale, the UC Davis CALVIN modeling effort provides a primitive implementation of some of the above criteria.

Division of Labor

A substantial technical side is needed to complement policy discussions of California water. It is perhaps too much to ask of one individual to oversee both the development of policy ideas among stakeholders and the development and testing of water management ideas technically and scientifically. Each task requires different skills and emphasis – and different forms of outreach and synthesis among stakeholders and expertise-holders. Aside from the different natures of the tasks, it is too much stuff overall for one person to manage. As a single job, the policy dialog must always take precedence, leaving the long-term and detailed task of technical consensus neglected. While the lack of technical consensus, testing, and creativity is expedient in the short run, it serves California’s long-term interests poorly.

If the water plan is to have a technical side, DWR should have a semi-independent technical director with DWR-wide authority and resources. (Internally, DWR lacks an ability to integrate its technical talents for Water Plan purposes.) A sustained broad technical process, similar and parallel to the policy process would be valuable. A broad-based technical path, with a framework to give it coherence, would be required both to complement the broad policy approach to the CWP and reflect the unavoidable narrow resource and expertise base of DWR (despite their best intentions). A broad-based technical approach is also much more suitable for the regional policy approach advocated by the Water Plan.

If the State remains unable to muster or assemble technical capability to support California Water Plan functions, then perhaps the Water Plan should abandon pretension and devolve into a pure policy document. A pure policy consensus document would have significant value (as this Water Plan does), require fewer State resources, and reduce State involvement (for good and bad) in local and regional water management. However, it would be a weaker assessment if limited to a consensus of experienced opinion.

Overall Comments

Bulletin 160-05 provides the beginnings of a new direction for the California Water Plan. This new direction is welcome and long overdue. However, many of its details remain to be worked out. It would be useful for DWR to collect some thoughts from the political leadership and water management community to assess how this new direction can be solidified to be of broad utility.

The policy conclusions of Bulletin 160-05 largely represent a broad consensus of diverse and experienced opinion on California water. Some very important conclusions and new directions for State water policy emerge from this historic consensus. The shift of initiative and responsibility for water provision from centralized State government to local and regional providers is especially important and appropriate for our era. The emphasis on a broad and integrated portfolio of water management actions (ranging from water conservation, water marketing, and water reuse, to traditional infrastructure) is also welcome and appropriate for now and the foreseeable future.

However, on the technical side, the plan has essentially no substance and offers little guidance. The technical accomplishments of Bulletin 160-05 have not substantially furthered our ability to dispassionately analyze the likely performance of alternative management actions. Partial scenarios and water flow “portfolios” are nice, but merely inform us of some complexities and difficulties of planning for this system (hardly new conclusions), and do nothing to satisfy our

appetite and need for development and dispassionate comparison of alternative and creative management policies and actions. (Apparently, I am passionate about dispassionate comparison.) While Bulletin 160-05 reflects a very useful policy consensus of experienced and interested parties, no solid scientific or technical basis has been mustered to support, refute, or aid in the refinement or implementation of this consensus.

Bowing (shamefully) to the usual need for grotesque summary in a policy-making environment, the following “report card” evaluates how well the water plan draft appears to perform in terms of the functions of a State water plan. Overall, the grades are not bad for a group of students who have had to develop and teach a very different course to themselves. DWR staff, in particular, has made many improvements and really stretched itself for this report and their efforts are congratulated.

Functional performance of the Bulletin 160-05 Public Review Draft

Function	B160-05 Grade	Explanation
Education for Political Leaders	B+	Better policy focus, regional presentations and discussion of water management options; little discussion of how these pieces fit together in a statewide policy context
Education of Public	B-	Much improved presentations of regional water management and diverse water management options; limited discussion of how these pieces go together
Education for Water Managers	B-	Much improved presentations of water management options; limited discussion of how these pieces go together
Leadership in Content	C+	Greatly improved direction towards greater local and regional involvement and use of many water management options; this direction needs more maturing to become more useful; pieces do not fit together yet.
Leadership in Method	C+	A- for leadership in method of plan development, for work on quasi-consensus plan development D- for leadership in method regarding plan and alternative analysis
Reference Document	D	Improved transparency and some educational results (“water portfolios” and “scenarios”), but lack of a coherent analytical framework severely limits applicability to local and regional analysis. Implementation of a coherent and purposeful analytical framework is essential. No ability to develop and compare integrated or independent water management strategies.

References

- Lund, J.R. and R. Wilkinson (2005), “Minding the Gap: Traditional versus Modern Supply and Demand Analysis for California Water,” contribution to the California Water Plan Update, June 14, 2005.
- Wurbs, R. (2005), “Texas Water Availability Modeling,” *Journal of Water Resources Planning and Management*, Vol. 131, No. 4, pp. 270-279.